ABSTRACT

A semiconductor diode laser that generates light at wavelengths longer than conventional diode lasers. The laser includes a first gain element that generates a first "pump" laser beam having a first optical frequency and a second gain element that generates a second "pump" laser beam having a second optical frequency. The first and second pump beams are mixed in a third section to create a wave of nonlinear polarization oscillating at the difference frequency of the first two beams. Power from this nonlinear polarization wave is coupled by a near-field phase grating to excite an electromagnetic output beam which propagates perpendicular to the laser axis. The frequency of this output beam may be much smaller than either pump beam.